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| 10/665,346 | 09/22/2003 | Yujin Yamazaki | 826.1895 | 7037 |

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| EXAMINER |
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CHANG, AUDREY Y

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| ART UNIT | PAPER NUMBER |
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2872

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

577

Office Action Summary

Application No.

10/665,346

Applicant(s)

YAMAZAKI ET AL.

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on February 28, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 1, 2, 4, 5, 7-13, has canceled claim 6 and has newly added claims 14 and 15.
- The rejections to claims 1-13 under 35 USC 112, second paragraph, set forth in the previous Office Action *are withdrawn* in response to applicant's amendment.
- Claims 1-5 and 7-15 remain pending in this application.

Response to Amendment

1. The amendment filed on **February 28, 2005** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the *amended claim 1* and *newly added claims 14 and 15* recites the phrase "a stress correction film formed on the second surface (of the substrate)". The specification only gives the support for the stress correction film is formed on the surface of the *multi-layer film*, (please see Figures 5-8 and 12).

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

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pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1-5 and 7-15 are rejected under 35 U.S.C. 112, first paragraph**, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The reasons for rejection based on the newly added matters are set forth in the paragraph above.

Claim Objections

4. **Claims 1-13 and newly added claims 14-15 are objected to because of the following informalities:**

(1) The amended claim 1 and newly added claims 14 and 15 recite the phrase “multi-layer film” that is confusing and indefinite. Since it is really not clear if this phrase means there is a *single film* or a *multi-layer film* (i.e. a *plural layers of film*). This rejection has been set forth in the previous Offices Action, however applicant *fails* to respond and to clarify the issue. **Claim 1 has been amended** from reciting “a first (or second) multi-layer film with a first (or second) refractive index” to “a first (or second) multi-layer film” however this phrase still *fails* to clearly recite if this means a *single* film or plural films.

(2). The amended claim 1 and newly submitted claims 14 and 15 recite “a second multi-layer film formed on the second surface” and “a stress correction film formed on the second surface” that are really confusing since it is not clear how could **both** the multi-layer film and the stress correction film be formed on second surface of the substrate at the same time. It is really not clear what are the structural relationships between the stress correction film and the second multi-layer film.

(3) The amended claim 1 and newly added claims 14 and 15 recites the phrase “substrate is fixed via the first surface to a fixing material” that is confusing and indefinite since the claims lack a

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logical relationship between the fixing material and the optical device to define an operable and definite optical system. The fixing material can only be broadly interpreted as one can **arbitrarily** adhered the optical device to any other element. It is really not clear what if this is what the scope of the claims.

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 1-5, 7-13 and newly added claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Shirasaki (PN. 5,930,045) in view of the patents issued to Fujii (PN. 5,424,876) and Okumura et al (PN. 5,969,902).**

Claim 1 has been significantly amended it therefore necessitates the new grounds of rejections.

Shirasaki teaches a *virtual imaged phased array* (VIPA) that is comprised of a *substrate* (164, Figures 12(A)) and a *first reflecting film* (166) placed on a *first surface* of the substrate and a *second reflecting film* (168) placed on a *second surface* of the substrate. The two reflecting films each comprises at least one layer and implicitly has a first and second refractive index. Since the term “multi-layer film” is not definitely defined here, (for the reasons stated above), it cannot be addressed here.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the VIPA has a *stress correction film* formed on the second surface of the substrate. **Fujii** in the same field of endeavor teaches to use a *silicon dioxide layer* in a *multi-layer mirror* such that the

silicon dioxide layer imposes a compressive stress on the substrate of the multi-layer mirror such that the stress on the substrate resulted from all the other multi-layer films in the mirror may be reduced, (please see column 2, lines 1-49). It would then have been obvious to apply the teachings of Fujii to add a silicon dioxide layer to the VIPA as a stress correction layer for the benefit of reducing the possible damages or distortion to the substrate of the VIPA induced by the stress of the reflecting films and by the expansion of the substrate under high heat environment. Although these references do not teach explicitly that the stress correction film (i.e. the silicon dioxide film) is provided to correct the stress imposed by both reflecting films on the both sides of the substrate. Such modification would have been obvious to one skilled in the art since the thickness of the silicon dioxide as Fujii teaches explicitly (please see column 4, lines 3-8), is selected particularly to correct and compensate the *net stress* upon the substrate whether the stress is from one film on one side or films on the both sides. The stress on the substrate is a resultant *net stress* on the substrate and that resultant stress is being corrected by the silicon dioxide layer with selected thickness. With regard to claims 2-4, Fujii teaches that the stress correction film is a silicon dioxide film and its thickness may be adjusted to properly reduce the stress. The thickness of the silicon dioxide film is also selected so that it *does not effect* the optical property of the multi-layer mirror. It is a well-known knowledge in the art that in a multi-layer film structure, in order for the layer not to effect the optical property the layer should have an optical thickness of half or multiple of half of the specific wavelength of interested in order for the light effected by the layer be completely out of phase. Such modification therefore is considered obvious to one skilled in the art so that the silicon dioxide layer will not effect the reflectivity of the reflective layers (166 or 168). The optical flatness of the substrate being within one wavelength or less is rather standard in the art for the purpose of reducing unwanted scattering of the light at the surface.

With regard to claim 5, Shirasaki teaches that the VIPA (240, Figures 17-20) may be utilized with a mirror (254) to realize a dispersion compensator.

The amended claim 1 and the newly submitted claims 14 and 15 recite that the substrate is fixed to a fixing layer having the same thermal expansion coefficient as the substrate. It is not clear what is logical relationship between the fixing material and the substrate and the optical device it therefore can only be examined in the broadest interpretation. It is implicitly true that the VIPA of Shirasaki must be held by a holder in order for it to be positioned and utilized in an optical system such as shown in Figures 13 and 17-19. This means the VIPA is *fixed* to certain *fixing material* such as a *holder*. It is well known in the art that in a high temperature environment, materials of different thermal expansion coefficient will expand or contract differently, which may cause distortion. It would then have been obvious to one skilled in the art to make the holder of the VIPA having the same thermal expansion coefficient as the substrate of VIPA, as explicitly taught by Okumura et al to make the disk substrate *support member* and the disk *substrate* with the materials having the *same* thermal expansion coefficient, to prevent distortion to the substrate when held by the support member or the holder for the benefit of eliminating distortion and errors in the substrate and therefore the VIPA filter.

With regard to claims 7-13, although these references do not teach that the holder or the fixing material is made of the various materials claimed, such modifications would have been obvious to one skilled in the art to select desired materials having the same thermal expansion coefficient as the holder for the VIPA for the benefit of using a variety of alternative materials as the materials for making the holder that fixes the substrate of the VIPA and at the same time not cause distortion to the substrate. The fixing to the protector plate may be considered as optically jointed.

Response to Arguments

7. Applicant's arguments with respect to amended claims 1-5 and 7-13 and newly added claims 14-15 have been considered but are moot in view of the new ground(s) of rejection.

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8. Applicant's arguments are mainly drawn to the newly amended features and newly added claims that they have been fully addressed in the paragraphs above.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

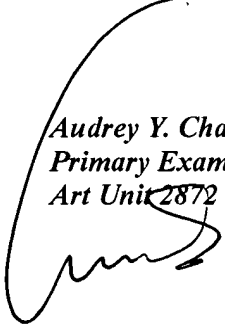
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang
Primary Examiner
Art Unit 2872



A. Chang, Ph.D.